

*REMARKS/ARGUMENTS*

The amendments set out above and the following remarks are believed responsive to the points raised by the Office Action dated May 5, 2009. In view of the amendments set out above and the following remarks, reconsideration is respectfully requested.

*The Pending Claims*

Claims 3, 12, 13, 15, and 19-31 have been canceled, and claims 1, 2, 4-11, 14, 16-18, and 32-36 remain pending. Claims 37-46 are added by this amendment.

Claims 37-46 have been added to describe the invention more clearly. No new matter has been added, the basis for the claim language may be found within the original specification, claims and drawings. Claim 37 is supported at, for example, paragraph [0044]; claims 38-40 are supported at, for example, paragraph [0047]; and claims 41-46 are supported at, for example, paragraph [0049]. Entry of the above is respectfully requested.

*The Office Action*

For convenience, the following remarks will address the rejections in the same order they were raised in the Final Office Action.

Claims 1, 2, 4-11, 14, 16-18, and 32-36 were rejected under 35 USC 103(a) as being unpatentable over the combination of U.S. Patent No. 6,117,497 to Murahara et al. (hereinafter referred to as "Murahara"), U.S. Patent No. 4,946,903 to Gardella, Jr. et al. (hereinafter referred to as "Gardella") and/or U.S. Patent No. 5,158,680 to Kawai et al. (hereinafter referred to as "Kawai"). This rejection is respectfully traversed.

For subject matter defined by a claim to be considered obvious, the Office must demonstrate that the differences between the claimed subject matter and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 USC 103(a); see also *Graham v. John Deere Co.*, 383 US 1, 148 USPQ 459 (1996). The ultimate determination of whether an invention is or is not obvious is based on certain factual inquiries including: (1) the scope and content of the prior art, (2) the level of ordinary skill in

the prior art, (3) the differences between the claimed invention and the prior art, and (4) objective evidence of nonobviousness. *Graham*, 383 US at 17-18, 148 USPQ at 467.

Consideration of the aforementioned *Graham* factors here indicates that the present invention, as defined by the pending claims, is unobvious in view of the cited references.

For purposes of the analysis here, and for the sake of argument, the level of ordinary skill in the art can be considered to be relatively high, such that a person of ordinary skill in the art would have an advanced degree and/or several years of experience in the relevant field.

Regarding the scope and content of the prior art, and the differences between the claimed invention and the prior art, Murahara teaches a “*surface* modification method” (col. 3, lines 9-10, emphasis added) wherein the space between the surface of glass as an entrance window for light such as ultraviolet light and the surface of a workpiece is made very thin (col. 2, lines 57-60; *see also*, Figure 4). This is reinforced by the Examples, repeatedly referring to the “surface modified” material (e.g., col. 17, line 56 (Example 13); col. 18, line 2 (Example 14); col. 18, line 60 (Example 18); Examples 20-26). Gardella, like Murahara, teaches surface modification (*see, for example*, col. 3, line 45: “the methods impart surface wettability”), col. 4, lines 54-55: “increased wettability and other surface properties”).

Kawai emphasizes providing a coated membrane and merely teaches rendering the pores of a porous membrane hydrophilic by depositing various wetting agents, including surfactants, on the membrane (col. 7, lines 19-24). There is no mention of CWST, wetting/dewetting ratio, F/C ratio, or O/C ratio. Moreover, as noted in the present application, such an approach (using a surfactant as taught by Kawai) is not satisfactory as it adds costs and process steps (*see, for example*, paragraph [0010] of the present application), and wetting agents can wash off over time. Furthermore, in contrast with advantages of the inventive membrane, that can be used in applications involving challenging liquids, e.g., corrosive liquids such as concentrated acids or bases (*see, for example*, paragraphs [0008], [0011] [[0033], and [0040] of the present application), there is no evidence that the coating and/or wetting agents of Kawai can hold up to such challenging liquids.

The present patent application teaches the Critical Wetting Surface Tension (CWST) through the thickness and bulk of the microporous membrane (*see*, paragraph [0044] referring to CWST as defined in U.S. Patent No. 4,925,572 (hereinafter, “the ‘572 patent”)). The ‘572 patent defines the CWST of a porous medium in units of dynes/cm as “the mean value of the surface tension of the liquid which is *absorbed* and that of a liquid of neighboring surface tension which is *not absorbed*” (col. 8, lines 21-25; emphasis added). While the Advisory Action states that critical wetting surface tension (CWST) is “only” a term coined by applicant, which “is the same as the surface tension or critical surface tension described in the references (see Gardella, for example),” Gardella specifically defines critical surface tension as “the value given indicating the surface tension of the liquid which totally spreads *on* the surface in question” (col. 8, lines 55-57; emphasis added). Thus, it is clear the statement in the Advisory Action is incorrect.

While the Final Office Action alleges that the O/C and F/C ratio “could” (page 3) be controlled to the desired values of CWST range, and the degree of substitution of fluorine atoms on PTFE surfaces “can” (page 4) be controlled to the desired value of surface tension, there is no such suggestion in the cited references, and there is no explanation in the Office Action as to why such modifications, particularly involving such disparate techniques (Murahara involves radiation selected from ultraviolet visible and infrared radiation, and requires a glass window for the radiation and a thin space between the glass and the surface of the material to be modified; Gardella involves radio frequency glow discharge; Kawai involves rendering the pores of a porous membrane hydrophilic by depositing various wetting agents on the membrane), would have been obvious to one of skill in the art. The Office Action also fails to explain how one of skill in the art could combine such disparate techniques to provide the claimed invention.

Moreover, as evidenced in the attached Declaration under 37 CFR 1.132 by Abdoulaye Doucouré, Ph.D., the conclusions stated in the Office Action regarding the combination of the teachings of Murahara and Gardella are incorrect.

Dr. Doucouré, one of the inventors of the claimed subject matter, has, including his doctoral and post-doctoral studies, over 15 years of experience in the areas of membrane and thin film technology. He has both a Ph.D. in Materials Chemistry and a Diplome d’Etudes

Appfondies (M.S.) Concentration, Polymers, Interface and Amorphous States, from the University of Montpellier II.

With respect to the combination of the disparate techniques of the cited references, Dr. Doucouré states that, at his direction, membranes were prepared following the teachings of Murahara and Gardella, and the membranes were analyzed (Doucouré Declaration, ¶¶ 7-10 ). Subsequently, membranes were prepared following the teachings of Murahara, and then treated following the teachings of Gardella, and vice versa. (Doucouré Declaration, ¶¶ 11-12). The resultant membranes were analyzed (Doucouré Declaration, ¶¶ 11-12).

As Dr. Doucure states, neither the membranes prepared following the teachings of Murahara, and then treated following the teachings of Gardella (the “UV treated/RF treated prepared membranes”), nor the membranes prepared following the teachings of Gardella and then treated following the teachings of Murahara (the “RF treated/UV treated prepared membranes”), provided the membranes according to claims 1 and 6 (Doucouré Declaration, ¶ 13). Thus, the combination of the teachings of Murahara and Gardella would not produce the embodiment of the invention according to independent claims 1 and 6.

Moreover, Dr. Doucure states that, based upon his knowledge and experience, membranes having the F/C ratios of the UV treated/RF treated prepared membranes, and membranes having the F/C ratios of the RF treated/UV treated prepared membranes, “will have reduced tensile strength and elastic modulus and will not provide consistent results in an industrial setting” (Doucouré Declaration, ¶ 14). Dr. Doucure additionally states that, based upon his knowledge and experience, membranes having such F/C ratios “would be expected to lose their chemical and thermal stability when exposed to challenging liquids such as corrosive liquids and high temperature liquids, in contrast with membranes described in the Application” (Doucouré Declaration, ¶ 14).

Moreover, with respect to zeta potential (e.g., newly added claims 41-46), Dr. Doucure states that none of the UV treated/RF treated prepared membranes, and none of the RF treated/UV treated membranes, had a zeta potential in the range of from about -3 mV to about - 11 mV at a pH in the range of from about 4 to about 9 (Doucouré Declaration, ¶ 16).

The teachings of Kawai fail to remedy the deficiencies of Murahara and Gardella. Moreover, as explained in paragraph [0010] of the present application, the approach of Kawai is unsatisfactory, and there is no evidence that the coating and/or wetting agents of Kawai will remain stable in use with challenging liquids. Furthermore, for the reasons stated above (e.g., regarding membranes resulting from the combination of the teachings of Murahara and Gardella), combining the teachings of Kawai with those of Murahara and Gardella would not result in a membrane according to the claims 1 and 6; e.g., in view of the F/C ratio, the resultant membrane would not exhibit suitable tensile strength, elastic modulus, and provide consistent results in an industrial setting; and the resultant membrane would lose chemical and thermal stability when exposed to challenging liquids such as corrosive liquids and high temperature liquids, in contrast with membranes described in the present application. Additionally, since Kawai teaches coating the membranes to provide the desired characteristics, it fails to lead one to the invention according to claim 6, reciting, *inter alia*, a membrane free of a coating.

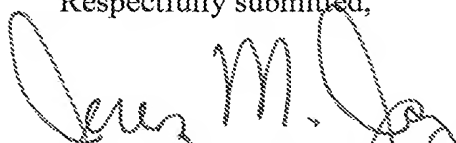
For purposes of the analysis here, there is no need to consider any objective criteria of nonobviousness.

Considering all of the *Graham* factors together, it is clear that the present invention as claimed in dependent claims 1 and 6 would not have been obvious to one of ordinary skill in the art at the relevant time in view of the combined disclosures of Murahara, Gardella, and Kawai. Since the independent claims are allowable for the reasons set forth above, the dependent claims are allowable as they depend from the novel and non-obvious independent claims. Accordingly, the obviousness rejection should be withdrawn.

*Conclusion*

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



Jeremy M. Jay, Reg. No. 33,587

LEYDIG, VOIT & MAYER

700 Thirteenth Street, N.W., Suite 300

Washington, DC 20005-3960

(202) 737-6770 (telephone)

(202) 737-6776 (facsimile)

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